

**Medical Care Needs in Poverty Thresholds:
Problems Posed by the Uninsured**

by

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There are many reasons for incorporating medical care needs into a revised measure of poverty. Most people consider medical care to be a basic necessity of life, as important as food, shelter, and clothing. This view of medical care as a basic necessity is supported by the fact that federal and state governments spend billions of dollars providing health insurance coverage in the form of Medicaid, Medicare, and other programs to those without access to private sources of coverage. Ignoring medical care costs altogether can result in misclassifying which families are in the greatest need. This is particularly true for those who are uninsured or who lack access to generous employer sponsored group coverage. For example, families with large out of pocket expenses for health care services or high health insurance premiums may be measured as living above the poverty line until health care expenses are taken into account. A revised poverty measure that explicitly accounts for basic medical care needs along with other basic needs such as food, clothing, and shelter has the advantage of identifying the neediest persons in our society by a single measure.

This paper compares several methods of incorporating medical care needs into a revised poverty measure. All of our measures are based in part on the recommendations of a National Academy of Sciences (NAS) panel which addressed many aspects of improving the measurement of poverty. The NAS panel also recognized the necessity of accounting for medical care needs in their revised measure. Their proposed solution, however, was to deduct actual out of pocket medical care expenditures from family resources before evaluating where a family stands in relation to the poverty threshold. In the NAS method the poverty threshold is based on expenditures for food, clothing, shelter and utilities plus a little bit more for other personal items. Medical care, in the NAS recommendation, is not included in the list of items that define poverty thresholds.

In this paper we compare the NAS approach of deducting medical care expenses from resources to an alternative approach of incorporating medical care expenses directly into poverty thresholds definitions. At the general computational level these measures are mathematically equivalent. If poverty determinations are made by comparing resources to a specified threshold, then deducting an amount of money from the right-hand (or resource) side of the equation is the same thing as adding it to the left-hand (or threshold) side of the equation. Depending on how they are implemented, however, the two approaches can be quite different from one another because of the highly skewed and unpredictable nature of medical care needs.

One way of characterizing the difference between the NAS method and the alternative measures presented in this paper is the theoretical justification underlying the measures. This paper is grounded in an *ex ante* view of poverty measurement, whereas the NAS panel characterized their method as an *ex post* calculation of how many families could not meet their basic needs out of their current income in the previous year. The *ex ante* view of poverty measurement looks forward arguing that poverty thresholds define a minimum level of basic needs that is expected to be sufficient. The *ex ante* view of poverty measurement takes care of the uncertainty surrounding future basic needs by taking the expected value. We believe this *ex ante* view is more strongly supported by the economic theory of expected utility and, furthermore, justifies an adjustment to the expenditures of the uninsured.

The uninsured pose problems to *ex post* poverty calculations because their actual spending may not accurately reflect their medical care needs. Research shows that uninsured families generally lack access to affordable private insurance options and consume less medical care than similar families with insurance coverage. (will add citations here) Poverty measures that are based on an *ex ante* approach, however, are able to justify an adjustment to the

expenditures of uninsured families that better reflects their expected medical care needs. This adjustment cannot be justified under an *ex post* approach to poverty measurement.

The remaining sections of this paper are presented as follows. We first present a conceptual discussion justifying the inclusion of medical care needs in poverty threshold definitions as well as an adjustment for the uninsured. Second, a section on data and methods is presented. Since poverty measurement is a complex and data-intensive effort where small differences in technique can lead to substantial differences in overall poverty rates we go into detail in this section. In the results section we first examine the overall distribution of the imputed medical expenditures and then analyze the effects of adding medical care needs to poverty thresholds. This section includes a comparison of poverty rates by different method and by different subgroup. Finally, the implications of our methodology and our results are discussed in the concluding section.

2. Conceptual Framework

Economic theory argues that when uncertainty is present, consumers' *expected* utility rather than utility should be the focus of public policy (Arrow, 1963 and 1965). We use expected utility theory to justify our *ex ante* view of poverty measurement. Expected utility theory deals with uncertainty by taking the expected value or mean of the utility function. We can use this model to when measuring uncertain medical care needs. Adding the expected value of future medical care needs to poverty thresholds is consistent with the way other basic needs are measured. Although poverty thresholds have traditionally been adjusted for family size and age of family head, they still represent the “average” amount of money that similar families would need to maintain a minimum level of well-being . It remains the case that particular families may actually require more or less than the threshold to get by at the “poverty” level.

In a previous paper by one of the current authors, it is explained why medical care consumption is difficult to incorporate into poverty thresholds (Banthin and Selden, 1999). First, medical care needs have much greater variation across individuals and families than other basic needs such as food and clothing. Second, the variation in need for medical care is not easy to predict; there is a lot of uncertainty surrounding medical care needs. Third, we cannot assume that private health insurance markets (through which consumers can reduce uncertainty) are smoothly functioning.

Both the skewness and the uncertainty of medical care spending pose problems in incorporating medical care needs into poverty thresholds. Yet these issues are not unique to medical care spending. For example, housing expenditures show large variation across families that we cannot fully account for in poverty thresholds because of lack of detailed data (such as neighborhood values). Housing needs also exhibit uncertainty from the risk of floods, fires, and rapid changes in mortgage interest rates and rental costs. These sources of variation in housing costs are not fully captured in the median expenditures that are used to define the shelter portion of poverty thresholds.

Once there is a consensus that medical care expenses cannot be ignored when measuring poverty then the question remains as to the best method of treating medical care. In this paper we implement a method of incorporating medical care needs, comparing the use of both mean and median expenditures, into poverty thresholds along with other basic needs. We believe this approach is more consistent with expected utility theory than the NAS method of deducting actual out of pocket medical care expenses from family resources.

The NAS method deducts actual rather than expected medical expenditures from family income. This method has the advantage of obviating problems caused by uncertainty and large

variation across family types because it preserves the distribution of medical out of pocket spending. The NAS method, however, also preserves the extremes of medical care spending that raise other concerns with respect to poverty measurement. It preserves the high expenditures that may be related to discretionary spending and it preserves the low expenditures that may be related to unmet needs and lack of access to affordable private insurance options.

Expected utility theory deals with uncertainty by taking the expected value or the mean. Adding medical care needs to poverty thresholds as a set of mean values is supported by expected utility theory and this is how we define our *ex ante* approach to poverty measurement. Although expected utility theory argues for the use of arithmetic means, we also use the median as an alternative measure of central tendency because of the skewed distribution of medical out of pocket expenditures. Since medical expenditures are highly skewed it is important to adjust the expected value of medical care by family characteristics that predict medical care needs such as age, family size, insurance status, and health status.

Incorporating medical care needs into poverty thresholds is equivalent to defining a basic need standard for medical care. In this regard it is also consistent with expected utility theory to examine areas where our data may not accurately reflect needs. Historically, poverty measurement in the United States has always relied on household expenditure surveys to supply the data by which poverty thresholds are defined. But research shows that medical care spending by uninsured families is lower than it would have been had they had access to affordable private insurance plan options. Therefore we follow the recommendations of a group of scholars and raise the expenditures for uninsured families to a level that represents what they would have spent out of pocket on health care services plus insurance premiums based on the spending of similar families with private insurance coverage. An *ex ante* perspective on poverty

measurement which emphasizes expected needs can justify adjustments to the actual spending reported by uninsured families.

3. Data and Methods

This paper makes use of data from two separate nationally representative household surveys: the 1996 Medical Expenditure Panel Survey (MEPS) and three years of data from the Consumer Expenditure Survey (CE) to develop poverty thresholds that include medical out of pocket spending. Poverty thresholds are then applied to families surveyed in the March Supplement of the Current Population Survey (CPS) for our final results.¹ We use data from the CPS, March 2000 which represents annual poverty statistics for 1999. In all cases medical out of pocket spending including expenditures on health care services as well as expenditures on health insurance premiums are used to represent medical care needs.

Determining the Reference Family Threshold

To calculate poverty thresholds for this analysis we follow the NAS methodology with some modifications. The NAS recommended that one family type (two adults and two children) be designated as the reference family. Poverty thresholds are first calculated for this family type and then adjusted using an equivalence scale for other family types, which vary by size and age of family members. Using data from the CE, families with two adults and two children are ranked according to their amount of spending on the NAS defined “basic bundle” of items: food, clothing, shelter, and utilities (FCSU). Following the NAS recommendations we calculate reference family thresholds based on a percentage of median expenditures for these items.

¹ See <http://www.bls.census.gov/cps/ads/adsmain.htm> for information on the March Supplement to the CPS.

For this study, however, we go beyond the NAS recommendations and add medical out-of-pocket consumption to the basic bundle of goods. We refer to these new thresholds as food, clothing, shelter, utilities, and medical care (FCUSM) thresholds. In our paper we also allow family types to vary by health insurance status and by health status. Adding medical out of pocket (MOOP) expenditures to poverty thresholds raises several measurement issues some of which were discussed in the preceding discussion. To gauge the effect of some of these measurement issues on final poverty rates, we conduct sensitivity tests across three sources of possible variation in the measurement of MOOP expenditures.

First we compare the effects on poverty rates of using CE or MEPS data to estimate MOOP expenditures. Each survey has its own advantages. The CE is a much larger survey and collects data on all types of expenditures. The MEPS is smaller and focuses in detail on health expenditures. MOOP expenditures include spending on health care services as well as spending on health insurance premiums. Although both surveys collect detailed MOOP expenditure data from households, households may not be able to provide accurate reports on out of pocket health insurance premiums. To ensure the accuracy of reported premiums, the MEPS interviews both the households and the linked employers of household workers in order to collect data on health insurance premiums.

As previously mentioned MOOP expenditures exhibit a highly skewed distribution and this raises the question of how best to measure the central tendency of the distribution. To address this issue we compare the effect on poverty rates of using median as well as mean MOOP estimates. The decision to use means or medians comes up in two places in the poverty threshold calculations. Once when we add MOOP to the reference family basic bundle of goods and again when we decide how to adjust the reference family threshold to account for other

family types. Although many combinations are possible we try to be consistent by using means or medians at both decision points.

Third, we consider the problem raised by uninsured families. Following the recommendation of a group of scholars and academics who study poverty, we make an explicit adjustment to the MOOP expenditures of uninsured families.² We add an estimate of the cost of a “standard, unsubsidized insurance package” to the reported out of pocket spending on health care services. In our final results we compare the effects on poverty rates of making this adjustment.

Taking into account the variations listed above, we produce six different sets of poverty rate calculations which are based on five different reference family FCSUM thresholds. As summarized in Table 1 below, two sets of poverty rate calculations are based exclusively on CE data and start with the same reference family threshold. These two CE based poverty thresholds vary solely by the equivalence scales that are applied to the reference family threshold in order to adjust for other family types. The remaining four thresholds are based on a combination of CE and MEPS data. CE data is used to calculate the basic FSCU reference family threshold and MEPS data is used to add the MOOP component. We present the CE based measure first.

Table 1. Types of FCSUM Poverty Thresholds, by Source, Equivalence Scale and Adjustment

FCSUM Reference Family Thresholds	Source of MOOP Component	Basis of MOOP Equivalence Scale	Adjustment for Uninsured
CE reported data	CE, percent of median	CE means	No
--Same as above--	--same as above--	CE medians	No
MEPS means unadjusted	MEPS mean	MEPS means	No
MEPS medians unadjusted	MEPS median	MEPS medians	No
MEPS means adjusted	MEPS mean	MEPS means	Yes

² See “An Open Letter on Revising the Official Measure of Poverty,” August 2, 2000.

MEPS medians adjusted	MEPS median	MEPS medians	Yes
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The Consumer Expenditure Survey is conducted on a quarterly basis and we use the most recent three years of CE data, from quarter two of 1997 through quarter 1 of 2000, to construct poverty thresholds for this paper.³ All expenditures are adjusted to 1999 dollars using the CPI-U. The sample includes families who can provide one or more (up to four) quarters of data during their participation in the survey. To produce annual poverty thresholds for this study we annualized the quarterly data based on the assumption that the quarters are independent of one another. This assumption follows the NAS recommendations but may affect the level of the CE poverty thresholds. This issue is discussed more thoroughly in an appendix to this paper.

Equation (1), which is used to derive the basic bundle (FCSU) poverty threshold for the reference family, is based on recommendations from the NAS panel.

$$T_{FCSU} = \frac{(M_1 * P_1 * E_m) + (M_2 * P_2 * E_m)}{2} \quad (1)$$

where T_{FCSU} = threshold based on food, clothing, shelter, and utility expenditures
 M_1 = multiplier for smaller additional amount
 M_2 = multiplier for larger additional amount
 P_1 = lower percentage of median expenditures for basic bundle
 P_2 = higher percentage of median expenditures for basic bundle
 E_m = median expenditures for FCSU.

The Panel recommended using expenditures that lie between 78 percent and 83 percent of the median. These percentages correspond to the 30th and 35th percentiles of the distribution of total FCSU expenditures for a family of two adults and two children. To cover additional needs such as personal care, household supplies, and non-work transportation, the Panel recommended

adding a “little bit more” to the basic FCSU bundle by applying a multiplier between 1.15 and 1.25. Combining all these parameters yields equation (2).

$$T_{FCSU} = \frac{(1.15*0.78*E_m) + (1.25*0.83*E_m)}{2} \quad (2)$$

Adding MOOP to the Reference Family Threshold

To define a reference family threshold that includes out of pocket medical care expenditures we make some modifications to the NAS methodology that preserve as much as possible the original intent. Adding MOOP to the basic FCSU bundle significantly raises the level and changes the distribution of the redefined FCSUM basic bundle. However, we don’t want to confound the effects of adding MOOP by applying the same multipliers and factors to this larger amount. In order to isolate the effect of adding MOOP to poverty thresholds we first re-calculate the percentages of the median used to estimate the FCSUM thresholds so that these maintain the correspondence to the 30th and 35th percentile values of FCSUM expenditures as specified by the NAS panel. The reestimated percentages are only slightly different from the original parameters of 78 and 83 percents. For example, with the CE based FCSUM threshold the lower bound stays at 78 percent and the upper bound increases to 84 percent.⁴ Second, we

³ See <http://stats.bls.gov/csxhome.htm> for information on the U.S. Consumer Expenditure Survey.

⁴ Table a. Re-Estimated Percentages of Median FCSUM Expenditures for Reference Family: 1999

FCSUM Threshold	30 th Percentile	35 th Percentile
CE actual	0.78	0.84
MEPS median unadjusted	0.81	0.86
MEPS median adjusted	0.81	0.86
MEPS mean unadjusted	0.81	0.86
MEPS mean adjusted	0.82	0.86

limit the application of the “little bit more” multipliers to the non-medical portion of the total FCSUM bundle. This is shown in equation (3) below.⁵

$$T_{FCSUM} = (1 - s) \frac{(1.15 * P_1) + (1.25 * P_2)}{2} * E_{mm} + (s) \frac{(P_1) + (P_2)}{2} * E_{mm} \quad (3)$$

where T_{FCSUM} = threshold based on FCSUM expenditures
 s = medical out-of-pocket share of FCSUM median expenditures.
 E_{mm} = median expenditures for FCSUM.

We produce one reference family FCSUM threshold by using CE reported data on out of pocket medical care expenditures. We produce four additional reference family FCSUM thresholds based on combined CE and MEPS data. MOOP estimates from the 1996 MEPS are inflated to 1999 dollars using the medical component of the CPI and added to the CE derived FCSU expenditures of each reference family. As shown in Table 1, one estimate is based on the *mean* reported MOOP for all families in the 1996 MEPS who fit the NAS reference family definition. A second estimate is based on the *median* reported MOOP for all reference families. A third estimate is based on *mean* reported MOOP with an adjustment made to reference families who are uninsured. The final estimate is based on *median* reported MOOP with an adjustment for the uninsured.

The 1996 MEPS experienced significant nonresponse in the household premium data and this analysis makes use of imputed household premium data. The final imputations will rely on a

⁵ Another option to produce the FCSUM threshold would have been to recalculate the multiplier for the new bundle and then to have used equation (1) but for the FCSUM bundle. Such a multiplier would be less than the one applied to the FCSU median since the basic bundle is larger; the multiplier would need to account for less of the total expenditure value. For example, if the FCSU based multiplier were 1.2 then the new multiplier would be less than 1.2. Using the CE data and assuming independent quarterly data, the new multiplier is 1.186 for 1999. The MOOP share of the threshold could then be calculated as the ratio of the MOOP share of the FCSUM expenditures at the average of the 30th and 35th percentile values and the re-estimated multiplier. For example, if the re-estimated

combination of hotdeck and regression-based imputations. However, for the purposes of this paper, a provisional imputation method was used. Average premium contributions were imputed to privately insured families based on data from the 1996 MEPS – Insurance Component for the list sample of employers.⁶ These data provide nationally representative estimates of average premium contributions for employer sponsored private health insurance plans by single and family policies, industry, state, and other variables. The average contribution for a private single policy was \$342.41 in 1996. The average contribution for a private employer-sponsored family policy was \$1275.26 in 1996. Medicare Part B premiums of \$510.00 for 1996 were imputed to all individuals who reported Medicare coverage while average imputed Medigap premiums per beneficiary were \$1171.46 for 1996.

Without any adjustment for the uninsured, MEPS mean and median expenditures for reference families were \$2075.45 and \$1745 in 1996. With an adjustment for the uninsured, MEPS mean and median expenditures for reference families were \$2525.77 and \$1887 in 1996. The adjustment for the uninsured did not have a larger impact on the reference family MOOP amounts because relatively few two adult, two child families are classified as uninsured by our definition. To adjust the expenditures of uninsured families they received imputed values for total premiums (rather than the out of pocket portion contributed by employees). In 1996 dollars, the average imputed value over all single person uninsured families in the MEPS data was \$1991.64. The average imputed value over all two or more person uninsured families was \$4953.68.

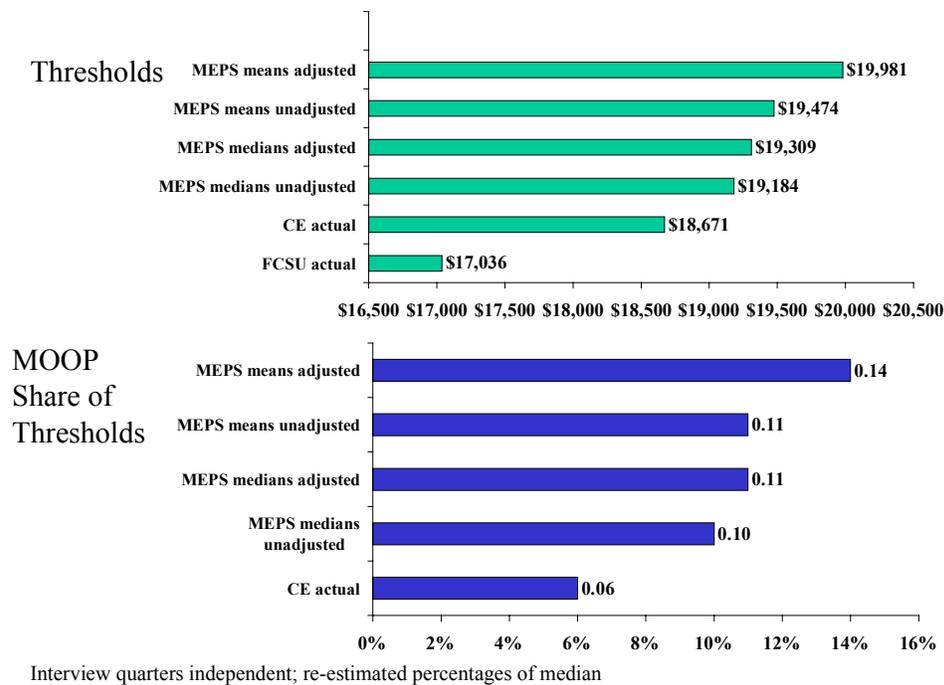
multiplier was 1.19 and the MOOP share of the FCSUM expenditures at the 30th and 35th percentile average was 0.075, then MOOP share of the new threshold would be 0.063.

⁶ These data are publicly available in tabular form at www.meps.ahrq.gov.

Final Reference Family Thresholds

The five FCSUM thresholds and MOOP shares calculated for the reference family are presented in Chart 1 below. The FCSU based threshold is \$17,036 for 1999 and the five FCSUM thresholds range from \$18,671 to \$19,981. The MOOP share ranges from 6 percent for the CE based estimate of MOOP to 14 percent for the MEPS mean estimates adjusted for the uninsured.

Chart 1. Reference Family Annual Thresholds and MOOP Shares: 1999



Applying the Equivalence Scales

After defining the reference family FCSUM thresholds, the next step in calculating poverty rates is to adjust the reference family threshold so that it can be applied to families of all

types. We use a three parameter equivalence scale to adjust the reference family FCSU threshold for other family types. The three parameter equivalence scale is explained in a recent Census Bureau report on experimental poverty measures (see Short, Garner, Johnson, and Doyle, 1999). We make use of this equivalence scale for the FCSU portion of our reference family thresholds. We then apply a separate equivalence scale to the MOOP portion of the reference family threshold.

This is shown below in equation (4).

$$Threshold_i = (1 - s)[FCSUM_{ref} * b_i] + (s)[FCSUM_{ref} * m_i] \quad (4)$$

where *Threshold* = Threshold for *ith* family
FCSUM_{ref} = Threshold for reference family
s = medical out-of-pocket share of FCSUM threshold.
m_i = MOOP equivalence scale for *ith* family (based on simple ratio)
b_i = three parameter equivalence scale for FCSU portion, for *ith* family

Tables 2 and 3 show the MEPS estimates for medical out of pocket spending by family type which are the basis of the four MOOP equivalence scales. Regression analysis was used to determine the most significant predictors of total MOOP by various family characteristics. Our analysis was limited to variables that are measured in both the MEPS and in the CPS. MEPS sample size also limited the number of cell definitions the MEPS could support. Final family type definitions are based on size of family, health insurance status, age of family members, and health status as shown in Tables 2 and 3. Health insurance is determined in a hierarchical definition. A family is categorized as privately insured if any member has private insurance. A family is categorized as publicly insured if any member has public insurance and no one has private insurance coverage. The remaining families are categorized as uninsured if every member of the family is without private or public health insurance coverage.

Table 4 presents the final six medical risk equivalence scales that were applied to the five reference family FCSUM thresholds. We calculate the MOOP equivalence scales as a simple ratio of the *ith* family's MOOP amount to the reference family's MOOP amount. Three of our equivalence scales are based on ratios of median expenditures and three of the equivalence scales

are based on ratios of mean expenditures. As mentioned earlier we consistently apply median (mean) based equivalence scales to median (mean) based MOOP measures.

Data from MEPS are used to produce the equivalence scale adjustments applied when the MEPS data are used to measure the MOOP expenditures for the reference family. In the four MEPS equivalence scales health status is an additional factor in the adjustment. Equivalence scales based on CE data are applied when CE data is used to measure the MOOP portion of FCSUM expenditures. Two of our six poverty measures are based on the same CE reference family threshold and vary only by the equivalence scale that is used. One is a scale based on CE means and the other is based on CE medians. However, when the CE data are used to generate equivalence scales, health status could not be used since this variable is not collected in the CE.

3. Results

Before discussing the impact on poverty rates that adding medical care needs to poverty thresholds has, it is important to examine differences in the imputed MOOP data. Table 5 presents some standard statistics for each of the six MOOP distributions used in this paper. These six distributions are compared to the MOOP distribution that is used in the NAS panel's model where MOOP is deducted from family resources. The NAS method is based on a conditional imputation of MOOP expenditures to individual family records. In the first stage the model predicts which families have any MOOP expenditures. In the second stage the model assigns specific amounts to those families according to a set of family characteristics. It is not surprising that this type of model preserves the skewed distribution of MOOP expenditures better than the six alternative methods which use aggregate cell-based imputation techniques. The NAS model's imputed values range from a minimum of \$0 to a maximum of over \$26,000.

Among the six alternative measures developed for this paper the highest maximum value is less than \$6,000. The NAS model's measures of skewness and kurtosis reveal a more skewed distribution overall compared to the six alternative measures developed in this paper.

Another important consideration is the aggregate value of imputed medical spending. The aggregate value of imputed MOOP should, in theory, be reasonably close to some other nationally representative benchmark. In this respect, however, we cannot make a final assessment of the six measures. The NAS model is based on data from the 1987 National Medical Expenditure Survey (NMES) which has been aged and reweighted to 1999 based on the National Health Accounts (See Short et al, 1999). This means that aggregate out of pocket medical spending for the NAS measure has already been weighted to a national benchmark while the other measures have not been reweighted in this manner. There is no consensus, however, on whether it is appropriate to reweight the MOOP data when other types of expenditure data used in poverty calculations are not reweighted.⁷

A comparison of the aggregate values raises another difference in the six alternative measures. When imputed MOOP values are based on the medians, it will always be the case that the aggregate sum will be substantially lower than the aggregate sum of a mean value imputation. This is seen in Table 5 in the last row of data. The aggregate value of imputed MOOP for the MEPS Median Unadjusted measure is \$173 billion compared to an aggregate value of \$216 billion for the MEPS Mean Unadjusted measure. Similar differences are seen between the other median and mean measures.

When we limit our comparisons to the six measures developed for this paper some additional patterns are exhibited. CE data reflects slightly lower levels of MOOP spending

compared to MEPS data. For example the aggregate value for the CE Mean Unadjusted was \$201 billion compared to \$216 billion for the aggregate value of the MEPS Mean Unadjusted measure. Similarly the mean imputed value was \$1,732 for the CE Mean Unadjusted and \$1864 for the MEPS Mean Unadjusted measures.

Table 5 also shows the impact of the adjustment for the uninsured which is seen best in terms of the aggregate imputed value. The adjustment for the uninsured results in an increase of \$40 billion to \$256 billion for the aggregate sum under the MEPS Mean Adjusted measure. An increase of \$37 billion is seen comparing the aggregate for the MEPS Median Unadjusted with the MEPS Median Adjusted measure. Both of these increases in aggregate amounts seem very high and suggest that some further sensitivity analyses on different imputation methods for adjusting for the uninsured would be an appropriate area for further research. There may be differences between the MEPS and CPS estimates of the number of uninsured families that also effect this adjustment.⁸

In Table 6 poverty rates are shown for all six alternative measures as well as for the official poverty measure and the NAS measure. The official poverty measure, which is the only measure of the eight presented in Table 6 not to account for medical spending in any way, produces the lowest annual poverty rate at 11.8 percent. The next highest poverty rates are produced by the two CE based measures at 13.5 percent. The CE rates are 1.2 percentage points lower than the NAS measure of 14.7 percent. This pattern shows that accounting for MOOP in any way seems to have a substantial impact on overall poverty rates. However, we also see that adding MOOP to thresholds rather than deducting it from resources is not as important a factor

⁷ Another more serious problem with reweighting any of the expenditure data used to create poverty thresholds is that it follows logically that the household income data should also be reweighted to match some national benchmark.

for overall poverty rates as the source of MOOP data. The largest differences in the overall poverty rate calculations seem to depend mainly on the source of the medical expenditure data and whether there is an adjustment for the uninsured.

Individuals living in uninsured families have a high poverty rate no matter what measure is applied. What is especially surprising is that the poverty rate for this group is 31.0 percent under the official measure and changes very little (ranging from 31.7 to 33.1 percent) under the next five measures listed in Table 6. Under the MEPS Median Adjusted and the MEPS Mean Adjusted measures, however, the poverty rate for this group jumps to 41.1 and 41.7 percent respectively. As one would expect, adjusting MOOP for the uninsured has the largest impact on poverty rates for the uninsured. The adjustment for the uninsured has a slight impact on persons in fair/poor health and increases poverty rates in this group by .5 to .8 of a percentage point. There is a similar slight increase in poverty rates among the disabled. Adjusting for the uninsured also raises poverty rates slightly among children and non-elderly adults while virtually no impact is seen among elderly adults. However, MEPS data cannot support a separate cell for uninsured elderly adults since there are so few of them.

Comparing median versus mean measures it is better to focus on the MEPS Unadjusted pair. While the overall poverty rate is 14.7 percent for the MEPS Mean Unadjusted measure and 14.1 percent for the MEPS Median Unadjusted measure, this difference of about 5.7 percent is not constant across major subgroups. Means yield relatively higher poverty rates compared to medians for the elderly; in this case the MEPS Mean Unadjusted poverty rate is 9.6 percent higher than the MEPS Median Unadjusted poverty rate for elderly persons.

⁸ This increase is surprisingly large and can be effected by mismeasurement of insurance status in the CPS. It is well known, for example, that the CPS undercounts persons enrolled in Medicaid.

4. Conclusion

The current official poverty measure is a very important policy tool for public policymakers, used in many ways. Its main purpose is to measure the economic well-being of American families and provide an estimate of how many families are living in conditions of economic hardship. Poverty statistics are published every year, thus they also represent one measure of the judging the U.S. economy's performance over time. In addition, poverty thresholds are also used to determine eligibility for public programs. The reasons for measuring poverty remind us that it is an inherently arbitrary (non-theoretical) measure where consensus is based on historical precedence, reasonableness, transparency, with some theoretical guidance from the statistical and social sciences.

It seems reasonable to treat medical care needs like other basic needs and incorporate them into poverty thresholds. Government policy at federal, state, and local levels has treated medical care as a basic need for decades with growing public expenditures for this purpose. Economic theory suggests that the uncertainty surrounding medical care needs require an expected utility approach which is consistent with the paper's method of adding MOOP to the thresholds. Our results show that there is little difference in overall poverty rates between adding MOOP to thresholds and deducting it from resources, yet economic theory gives greater support to the ex ante concept of adding MOOP to thresholds. Our results also show that further sensitivity testing is need to refine the MOOP imputation methods in terms of measures of central tendency, best data sources, and premium imputation methods. Adjustments to the expenditures of the uninsured may also need further refinements. Further examination of average and aggregate imputed values in comparison to privately insured families is needed.

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Table 2. Mean and Median MOOP: MEPS 1996, (no adjustment for uninsured)

<u>Family type</u>		<u>Mean</u>	<u>Median</u>
Reference family		2075.45	1745.00
<u>Fam type</u>	<u>Sick flag</u>	<u>Mean</u>	<u>Median</u>
<u>Families w/ no elderly</u>			
Private, 1 person	0	784.05	507
	1	1126.86	832
Private, 2 persons	0	2016.20	1727
	1	2745.82	2096
Private, 3+ persons	0	2199.32	1784
	1	2470.15	2095
Public, 1 person	0	371.22	32
	1	501.60	124
Public, 2+ persons	0	300.46	60
	1	574.89	165
Uninsured, 1 person	0	293.30	56
	1	685.09	298
Uninsured, 2+ persons	0	545.88	236
	1	968.25	468
<u>Families w/ elderly</u>			
Private, 1 person	0	2452.80	2170
	1	3168.34	2438
Private, 2+ persons	0	4780.67	4277
	1	5334.52	4518
Public, 1 person	0	1122.66	880
	1	1199.27	808
Public, 2+ persons	0	2172.50	1629
	1	2424.98	1825

Source: 1996 Medical Expenditure Panel Survey

Table 3. Mean and Median MOOP, MEPS 1996, (w/ adjustment for uninsured)

<u>Family type</u>		<u>Mean</u>	<u>Median</u>
Reference family		2525.77	1887
<u>Fam type</u>	<u>Sick flag</u>	<u>Mean</u>	<u>Median</u>
<u>Families w/ no elderly</u>			
Private, 1 person	0	784.05	507
	1	1126.86	832
Private, 2 persons	0	2016.20	1727
	1	2745.82	2096
Private, 3+ persons	0	2199.32	1784
	1	2470.15	2095
Public, 1 person	0	371.22	32
	1	501.60	124
Public, 2+ persons	0	300.46	60
	1	574.89	165
Uninsured, 1 person	0	2284.98	2048
	1	2676.69	2290
Uninsured, 2+ persons	0	5499.43	5188
	1	5921.77	5420
<u>Families w/ elderly</u>			
Private, 1 person	0	2452.80	2170
	1	3168.34	2438
Private, 2+ persons	0	4780.67	4277
	1	5334.52	4518
Public, 1 person	0	1122.66	880
	1	1199.27	808
Public, 2+ persons	0	2172.50	1629
	1	2424.98	1825

Source: 1996 Medical Expenditure Panel Survey

Table 4. Medical equivalence scales and shares

			MEPS adjusted		MEPS unadjusted		CE unadjusted		
			Mean	Median	Mean	Median	Mean	Median	
Share of threshold			13.6%	10.5%	11.5%	9.8%	6.3%	6.3%	
Reference family			1.00	1.00	1.00	1.00	1.00	1.00	
Families without any elderly persons									
Private	1 person	good health	0.31	0.27	0.38	0.29	0.58	0.41	
		fair/poor	0.45	0.44	0.54	0.48	0.58	0.41	
	2 persons	good health	0.80	0.92	0.97	0.99	1.08	1.01	
		fair/poor	1.09	1.11	1.32	1.20	1.08	1.01	
	3+ persons	good health	0.87	0.95	1.06	1.02	1.12	1.15	
		fair/poor	0.98	1.11	1.19	1.20	1.12	1.15	
Public	1 person	good health	0.15	0.02	0.18	0.02	0.31	0.42	
		fair/poor	0.20	0.07	0.24	0.07	0.31	0.42	
	2+ persons	good health	0.12	0.03	0.14	0.03	0.22	0.00	
		fair/poor	0.23	0.09	0.28	0.09	0.22	0.00	
	Uninsured	1 person	good health	0.90	1.09	0.14	0.03	0.16	0.00
			fair/poor	1.06	1.21	0.33	0.17	0.16	0.00
2+ persons		good health	2.18	2.75	0.26	0.14	0.34	0.00	
		fair/poor	2.34	2.87	0.47	0.27	0.34	0.00	
Families with at least one elderly person									
Private	1 person	good health	0.97	1.15	1.18	1.24	1.29	1.35	
		fair/poor	1.25	1.29	1.53	1.40	1.29	1.35	
	2+ persons	good health	1.89	2.27	2.30	2.45	1.94	2.31	
		fair/poor	2.11	2.39	2.57	2.59	1.94	2.31	
Public	1 person	good health	0.44	0.47	0.54	0.50	0.57	0.48	
		fair/poor	0.47	0.43	0.58	0.46	0.57	0.48	
	2+ persons	good health	0.86	0.86	1.05	0.93	0.91	0.90	
		fair/poor	0.96	0.97	1.17	1.05	0.91	0.90	

Table 5. Summary statistics of imputed MOOP distributions by method of imputation
All families

	NAS MOOP Measure	CE		MEPS		MEPS		MEPS	
		MEDIANS UNADJ	MEANS UNADJ	MEDIANS UNADJ	MEANS UNADJ	MEDIANS ADJ	MEANS ADJ	MEDIANS ADJ	MEANS ADJ
MOOP									
Mean	2,510	1,084	1,732	1,492	1,864	1,812	2,208		
Standard deviation	3,409	768	903	1,164	1,266	1,259	1,342		
Skewness	2.84	0.67	0.43	1.03	1.09	1.09	1.02		
Kurtosis	11.50	0.33	-0.06	0.92	1.08	0.96	0.72		
Minimum amount	0	0	314	32	293	32	300		
Median	1,311	1,242	1,908	1,727	2,016	1,784	2,199		
Maximum amount	26,576	2,864	3,711	4,518	5,335	5,420	5,922		
Aggregate (bil\$)	291	126	201	173	216	210	256		

Source: U.S. Census Bureau, Current Population Survey, March 2000.

Table 6. Poverty Rates by Selected Characteristics: 1999

	Official Measure	NAS MOOP Measure	CE MEDIANS		CE MEANS		MEPS MEDIANS		MEPS MEANS		MEPS MEANS	
			UNADJ	UNADJ	UNADJ	UNADJ	UNADJ	UNADJ	ADJ	ADJ	ADJ	ADJ
Total population	273,493	14.7	13.5	13.5	14.1	14.7	14.9	15.5				
Age group												
Children	71,731	19.3	18.2	18.3	18.7	19.2	19.6	20.1				
Nonelderly adults	169,141	12.0	11.2	11.2	11.5	11.8	12.3	12.8				
Elderly	32,621	9.7	15.0	14.9	17.7	19.4	17.6	19.5				
Family health status												
Excellent/good	217,005	9.7	10.8	10.8	11.2	11.5	12.0	12.4				
Fair/poor	56,488	20.0	23.9	23.9	25.3	26.6	25.8	27.4				
Family insurance status												
Private	214,821	4.9	6.3	6.3	7.0	7.4	6.9	7.4				
Public	35,412	41.2	45.2	45.5	45.8	47.3	45.7	47.4				
Uninsured	23,261	31.0	31.7	32.1	31.9	32.3	41.1	41.7				
Work disability status (people aged 15 to 64)												
Not in universe	96,270											
Not disabled	148,796	9.2	10.8	10.0	10.2	10.4	11.2	11.5				
Disabled	28,427	16.2	19.9	19.1	19.8	20.8	20.2	21.3				

Source: U.S. Census Bureau, Current Population Survey, March 2000.

Notes: Health status categories are defined consistent with MEPS definitions. Excellent/good = families where all members are in good or better health. Fair/poor = families where at least one member is in fair or poor health. Health insurance status categories are defined consistent with MEPS definitions. Privately insured = at least one member of the family has private insurance. Publicly insured = at least one member of the family has public insurance and no one has private insurance. Uninsured = every member of the family is without insurance of any type.

Appendix: Use of Four Complete Quarters of CE Interview Data to Compute Poverty Thresholds

There has been much discussion concerning whether three months' of CE data are adequate to represent a year's worth of out-of-pocket (MOOP) expenditures.⁹ Of course, the answer is expected to be 'no.' The Panel used three months of data, annualized, to produce the FCSU thresholds, although they recommended using only those consumer units who reported a complete year of expenditures. In the main body of this paper, we too follow the independent quarter assumption with regard to the CE data. However, in this appendix we examine the possible impact on reference person thresholds of the independent quarters' assumption.

A caution is warranted, however, with regard to these results: for this examination: we use the cross-sectional weights available in the Bureau of Labor Statistics' internal CE data file. However, it would have been more appropriate to use longitudinal weights for this exercise; such weights are not available for the CE. We could have used age of the reference person and housing tenure (homeowner or renter) to adjust the cross-sectional weights, as did Johnson, Shipp, and Garner (1997) in an earlier study in which they examined the impact of the independence assumption with regard to FCSU based thresholds.¹⁰ They made this adjustment since young renters are under-represented in the sample of consumer units who remain in the CE Survey for all interviews. However, whether the age-housing tenure adjustment is adequate when producing FCSUM poverty thresholds is left for future examination.

⁹ For example, this was an issue discussed at the University of Wisconsin-Madison conference on "Poverty: Improving the Definition After Thirty Years," April 1999, the Brookings Institution Workshop on Medical Care, July 1998, and Brookings Institution Meeting on Poverty Measurement, January 2000. Bavier (2000) has also addressed this issue. We, the authors, have also talked about this issue extensively since beginning this project.

¹⁰ In earlier research (Johnson, Shipp, and Garner 1997), FCSU thresholds using the CE quarterly data from two adult-two child consumer units are compared to thresholds using data from the same type of reference unit who reported a complete year of expenditures (12 continuous months, but not necessarily a calendar year of expenditures). Since 1980, consumer units participating in four full interviews represent about 75-80 percent of all consumer units interviewed. In this study, the cross-sectional population weights for consumer units were adjusted by age of the reference person and housing tenure (homeowner or renter). The thresholds using the four-quarter consumer units yield thresholds that are less than two percent different from the thresholds obtained by treating each quarter of data independently. The full four-quarter based thresholds are slightly higher than those based on the independent quarter data.

In order to produce thresholds using all four quarters of interviews, we first determine the number and percentage of all consumer units participating in the CE Interview which do not change their family type. This is important since we are interested in the expenditures of the reference family composed of two married adults and two children. Of the 76,692 consumer units interviewed between quarter two 1997 and quarter one 2000, only 11.0 percent of the consumer units (8447 consumer units) have the same number of adults and children and report expenditures for all four interviews. Of these, only 9 percent (767 consumer units) represent the reference family. This sample can be compared to the sample for which we assume the quarterly data are independent. Two adult-two child families represent 9 percent (6,917 consumer units) of all interviews conducted (76,792) during this same time period. The number of reference person consumer units is adequate statistically to produce thresholds based on the full four quarters of data. However, cells sizes are quite small when the data are dis-aggregated for the production of the medical risk index adjustment using the CE means or medians.¹¹

For comparison purposes only, median expenditures, thresholds, and MOOP shares are presented in Appendix Table XXX for thresholds based on data for which there is no adjustment in the expenditures for the under-utilization of medical care due the reference families' lack of health insurance. Results are for two sets of weighted samples. One for which the quarterly expenditure data are assumed to be independent, and another for which four complete quarters of data are used and are thus not assumed to be independent for the same reference family. Appendix Charts 1 and 2 also compare results for the two weighted samples.

All the thresholds based on four complete quarters of data are higher than the thresholds produced when the assumption of independent quarterly data is made. For the FCSU based threshold, the four complete quarter based threshold is 3.7 percent higher than the threshold resulting when quarterly are assumed to be independent. This percentage is slightly higher than that reported by Johnson, Shipp, and Garner (1997). For that

¹¹ Unpublished data available from Garner at the BLS, 2000.

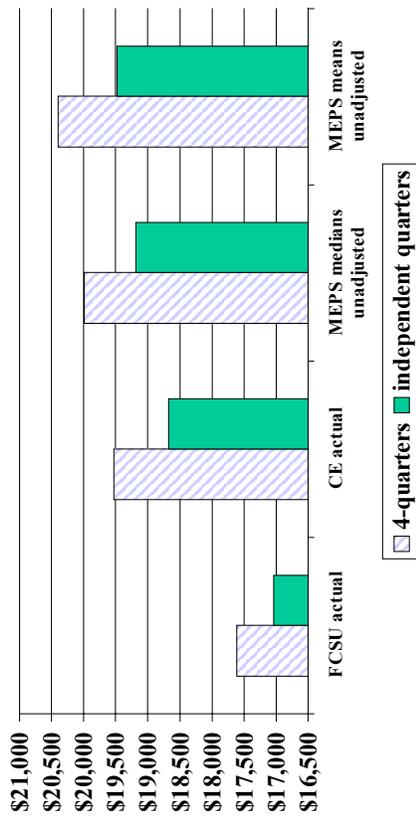
study, consumer units rather than families were the focus of the analysis and an age-housing tenure adjustment was made to the cross-sectional weight. Also, the percentages of the median were not re-estimated. The CE based FCSUM threshold is 4.6 percent higher when four complete quarters of data are used as opposed to when the quarterly data are assumed to be independent. The MEPS median unadjusted-based threshold is 4.2 percent higher, while the MEPS mean unadjusted based threshold is 4.8 percent higher. The MOOP share of the FCSUM threshold increases from 0.06 to 0.08 for the CE based threshold, but changes little for the MEPS based thresholds.

Appendix Table XXX. Reference Family 1999 Annual Thresholds and Medical Out of Pocket Shares: Independent Quarters and Four Full Quarters

	Median Expenditure		Threshold		MOOP Share of FCSUM Median		MOOP Share of FCSUM Threshold	
	Independent	4 complete quarters	Independent	4 complete quarters	Independent	4 complete quarters	Independent	4 complete quarters
	FCSU	\$17,613	\$18,206	\$17,036	\$17,610	n.a.	n.a.	n.a.
FCSUM CE actual – unadjusted	\$19,424	\$20,269	\$18,671	\$19,527	0.08	0.10	0.06	0.08
FCSUM MEPS median unadjusted	\$19,500	\$20,064	\$19,184	\$19,991	0.12	0.11	0.10	0.09
FCSUM MEPS mean unadjusted	\$19,859	\$20,424	\$19,474	\$20,402	0.13	0.13	0.11	0.11

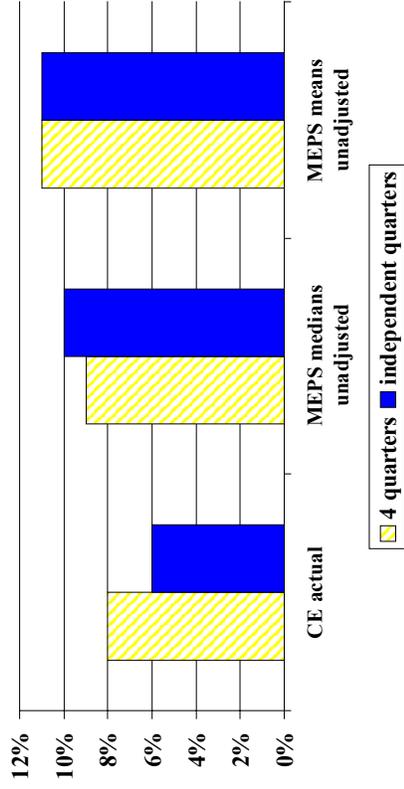
Assume CE Interview quarterly data are independent; re-estimated percentages of median.

Appendix Chart 1. Reference Family Annual Thresholds: 1999 (preliminary)



Re-estimated percentages of median

Appendix Chart 2. MOOP Share of Thresholds: 1999 (preliminary)



Re-estimated percentages of median

**Appendix table
Poverty Rates by Selected Characteristics: 1999**

	Official Measure	Consumer Expenditure Survey					
		Independent quarters		Four quarters		MEANS	
		MEDIANS	UNADJ	MEDIANS	UNADJ	UNADJ	UNADJ
Total population	273,493	11.8	13.5	13.5	14.4	14.6	
Age group							
Children	71,731	16.9	18.2	18.3	19.3	19.5	
Nonelderly adults	169,141	10.0	11.2	11.2	11.9	12.0	
Elderly	32,621	9.7	15.0	14.9	16.9	17.1	
Family health status							
Excellent/good	217,005	9.7	10.8	10.8	11.6	11.7	
Fair/poor	56,488	20.0	23.9	23.9	25.3	25.5	
Family insurance status							
Private	214,821	4.9	6.3	6.3	7.0	7.0	
Public	35,412	41.2	45.2	45.5	47.1	47.8	
Uninsured	23,261	31.0	31.7	32.1	33.0	33.6	
Work disability status (people aged 15 to 64)							
Not in universe	96,270						
Not disabled	148,796	9.2	10.0	10.0	10.5	10.7	
Disabled	28,427	16.2	19.1	19.1	20.3	20.7	

Notes:

Health status categories are defined as above in MEPS calculations

Excellent/good = families where all members are in good or better health

Fair/poor = families with at least one person in fair/poor health.

Insurance status categories are defined as above in MEPS calculations

Privately insured = at least one person in family has private insurance
Publicly insured = at least one person in family has public insurance and no one has any private insurance
Uninsured = every member of the family is without insurance of any type

Source: U.S. Census Bureau, Current Population Survey, March 2000.

Appendix table
Summary statistics of imputed MOOP distributions by method of
imputation
All persons

	Consumer Expenditure					
	Independent quarters		Survey		Four quarters	
	MEDIANS	UNADJ	MEANS	UNADJ	MEDIANS	UNADJ
MOOP						
Mean	1,221		1,900		1,461	1,951
Standard deviation	742		854		790	835
Skewness	0.38		0.18		0.41	0.31
Kurtosis	0.52		0.32		0.59	0.46
Minimum amount	0		314		1,211	474
Median	1,252		2,061		1,539	2,136
Maximum amount	2,864		3,711		3,225	3,774
Family Aggregate (bil\$)	126		201		152	208

Source: U.S. Census Bureau, Current Population Survey, March 2000.

Summary statistics of imputed MOOP distributions by method of
imputation
All families

	Consumer Expenditure					
	Independent quarters		Survey		Four quarters	
	MEDIANS	UNADJ	MEANS	UNADJ	MEDIANS	UNADJ
MOOP						
Mean	1,084		1,732		1,309	1,793
Standard deviation	768		903		821	880
Skewness	0.67		0.43		0.69	0.55
Kurtosis	0.33		-0.06		0.39	0.07
Minimum amount	0		314		121	474
Median	1,242		1,908		1,530	1,971

Maximum amount	2,864	3,711	3,225	3,774
Aggregate (bil\$)	126	201	152	208

Source: U.S. Census Bureau, Current Population Survey, March 2000.

Appendix table

Medical equivalence scales and shares

	Consumer Expenditure Survey					
	Independent quarters			Four quarters		
	Mean	Median	Mean	Median	Mean	Median
Share of threshold	6.3%	6.3%	8.1%	8.1%	8.1%	8.1%
Reference family	1.00	1.00	1.00	1.00	1.00	1.00
Families without any elderly persons						
Private						
1 person	0.58	0.41	0.58	0.41	0.48	0.48
good health						
fair/poor	0.58	0.41	0.58	0.41	0.48	0.48
2 persons	1.08	1.01	1.10	1.10	0.99	0.99
good health						
fair/poor	1.08	1.01	1.10	1.10	0.99	0.99
3+ persons	1.12	1.15	1.08	1.08	1.07	1.07
good health						
fair/poor	1.12	1.15	1.08	1.08	1.07	1.07
Public						
1 person	0.31	0.42	0.34	0.34	0.26	0.26
good health						
fair/poor	0.31	0.42	0.34	0.34	0.26	0.26
2+ persons	0.22	0.00	0.24	0.24	0.08	0.08
good health						
fair/poor	0.22	0.00	0.24	0.24	0.08	0.08
Uninsured						
1 person	0.16	0.00	0.27	0.27	0.09	0.09
good health						
fair/poor	0.16	0.00	0.27	0.27	0.09	0.09
2+ persons	0.34	0.00	0.42	0.42	0.19	0.19
good health						
fair/poor	0.34	0.00	0.42	0.42	0.19	0.19
Families with at least one elderly person						
Private						
1 person	1.29	1.35	1.24	1.35	1.20	1.20
good health						
fair/poor	1.29	1.35	1.24	1.35	1.20	1.20
2+ persons	1.94	2.31	1.92	2.31	2.10	2.10
good health						
fair/poor	1.94	2.31	1.92	2.31	2.10	2.10
Public						
1 person	0.57	0.48	0.57	0.48	0.45	0.45
good health						
fair/poor	0.57	0.48	0.57	0.48	0.45	0.45

2+	good health	0.91	0.90	0.93	0.84
persons	fair/poor	0.91	0.90	0.93	0.84